

# The Cambridge Water Company

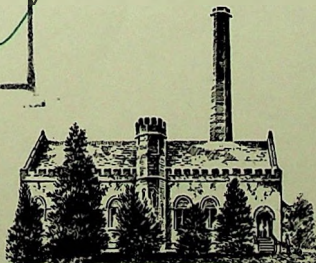
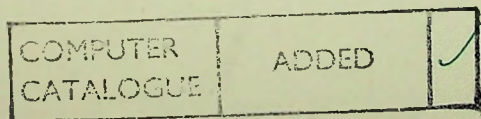


**A brief history**

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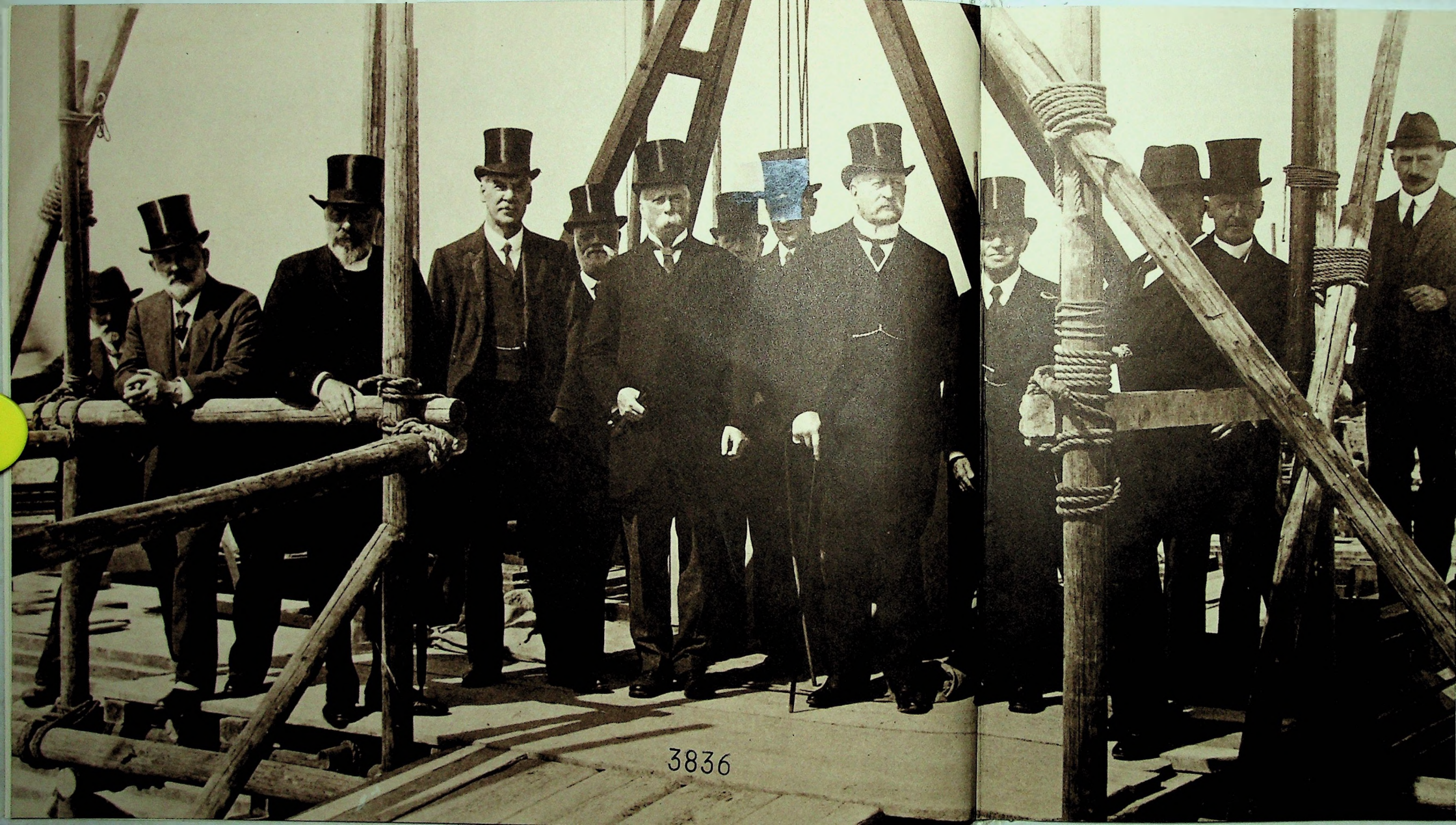
# The Cambridge Water Company

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**Incorporated on 14 June 1853 by special Act of Parliament**





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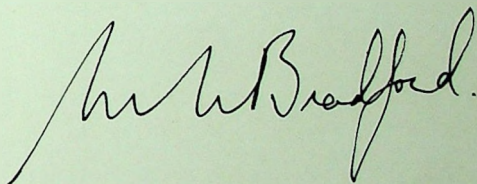


## Foreword

The provision of piped supplies of pure water to towns is one of the great social achievements of the last century. It was in the middle of that century that the pressing need for better water supplies for the City of Cambridge caused steps to be taken which resulted in the incorporation of Cambridge University and Town Waterworks Company.

This brief history begins with an account of the water supplies available to earlier generations before the Company brought piped water into the city for a population then less than 30,000 and continues with a description of the founding of the Company and its subsequent growth until now, in 1982, it provides for the needs of a population of 250,000 over an area of 453 square miles.

It has been compiled by A. G. Moores, I.P.F.A., D.P.A. (formerly Finance Director and Secretary of the Company) and in respect of the earlier period is based upon a history written for the occasion of the Company's centenary, in 1953, by T. C. Nicholas, O.B.E., M.C., M.A. (Fellow of Trinity and former Deputy Chairman of the Company).

A large, stylized handwritten signature in black ink, which appears to read 'A. G. Moores'.

Chairman

Cambridge  
1982



*Plan of the Town of Cambridge  
shewing the Line of the Ancient King's Ditch.*

## The water supply of medieval Cambridge

Medieval Cambridge obtained its water partly from wells, partly from the river and partly from an artificial channel known as 'The King's Ditch' which defended the town on the south and east. Its course left the river near Silver Street and, passing by way of Pembroke Street, Hobson Street and Park Street, rejoined the Cam near Magdalene College. As the river and the King's Ditch were also used for disposal of refuse, their waters must have been grossly polluted and the water drawn by pumps or buckets from shallow wells among the thickly clustered houses, where drains were non-existent, can have been little better. Small wonder that pestilences were rife and mortality high.

The first steps to supply pure water from outside the town were taken in 1325 by the Franciscans or Greyfriars. They selected a spring issuing from the gravels which underlie the rising ground to the west of Cambridge now occupied by the Observatory and University Farm and laid a lead pipe from it for a distance of a mile-and-a-half to their buildings which stood upon the site now occupied by Sidney Sussex College. After traversing what was then open field and crossing the river Cam, this pipe passed along a lane subsequently incorporated into the Great Court of Trinity College. Following the suppression of the House of the Franciscans by Henry VIII, this conduit was granted by him to Trinity College in 1546 and was used to supply the fountain in the Great Court, which remained for some 300 years the main source of water for the College, while a tap, which still exists outside the Great Gate, provided a supply for the public.

## Hobson's Conduit

With the growth of the University and the town the need for pure water became ever more pressing and in 1574 Dr Andrew Perne, Master of Peterhouse, in writing to the Chancellor of the University, Lord Burghley, upon an outbreak of the plague in Cambridge, expressed the view 'our synnes is the principal cause; the other, as I conjecture, is the corruption of the King's Dytych'. He went on to suggest that a stream flowing from the Nine Wells, a group of strong springs situated near the railway line between Cambridge and Shelford, should be led into a conduit to bring the water into Cambridge and to flush the King's Ditch.

This wise suggestion was eventually carried out in 1610 as a joint undertaking of the University and Town and a new open channel was dug from the Nine Wells to bring the water to the outskirts of the town whence part of it was piped to a fountain in the Market Place and part used to cleanse the King's Ditch and various drains and watercourses belonging to colleges.

The King's Ditch has long since been filled in and built over but the



pleasant brook, now known as Hobson's brook, continued until recently to supply water to a fountain in the Market Place, although this is not the one erected in 1614 which was removed to the corner of Trumpington Road and Lensfield Road when the Market Place was enlarged over a century ago. An inscription on the old fountain states that it was built at the sole charge of Thomas Hobson (the carrier whose memory is perpetuated in the phrase 'Hobson's choice'), but Hobson was, in fact, only one of a number of public-spirited citizens who contributed to the undertaking. This brook is also the source of the streams flowing on either side of Trumpington Street and St Andrew's Street.

## The founding of the Company

Although from a petition presented to Parliament in 1788 asking for water from Hobson's Conduit to be made more widely available there is evidence that the need for more plentiful supplies was an ever-present problem nearly two-and-a-half centuries elapsed before definite steps were taken to provide them.

In 1852, the Vice-Chancellor, Dr Richard Okes, Provost of King's College, was instrumental in the setting up of a committee consisting of heads of colleges and leading citizens to promote an undertaking to supply the town with water from the Paper Mills stream which flows from a large spring at Cherry Hinton and crosses under the Cambridge-Newmarket Road near the railway bridge. This led to the appointment of Mr James Simpson, an eminent civil engineer of Westminster, to prepare a scheme for the collection and distribution of water from the Paper Mills stream and an application for an incorporating Act was lodged in Parliament in November 1852. This received the Royal Assent on 14 June 1853.

The Act authorised the issue of shares of £10 each to the value of £25,000 and the borrowing on mortgage of a further £5,000.

The deposited plans showed as the intended source of supply a collecting chamber at 'The Spring-Head' beside the crossroads at the south end of Cherry Hinton village, which constitutes the source of the Paper Mills stream and also a well not far from the Spring-Head. The Company took the name of the Cambridge University and Town Waterworks Company and its area of supply comprised the Town and University of Cambridge and eight adjoining parishes. Another six neighbouring parishes were added in 1866 making a total supply area of sixty square miles at which figure it remained until 1963.

## The opening of the original works

In as much as members of the University had played so prominent a part in promoting the undertaking it was arranged that half the original Board of Directors should be members of the University and half members of the Town. This arrangement of equal representation



The Market Place with the original fountain.

CAMBRIDGE WATERWORKS.		
DINNER AT THE LION HOTEL.		
ON TUESDAY, OCTOBER 23, 1855.		
LIST OF TOASTS.		
PROPOSER.		TO RESPOND.
The Chairman.	1. THE QUEEN.	
Ditto.	2. The Emperor of the French.	
Ditto.	3. Prince Albert, Prince of Wales, and the rest of the Royal Family.	
Ditto.	4. The Allied Armies and Navies, and continued success to their exertions.	Capt. Davies.
Libert.-Col. Adair, M.P.	5. Prosperity to the University and Town Water-Works.	Rev. J. Fenwick.
Mr. Waddington.	6. Prosperity to the University.	Master of Jesus College.
The V.-P. of King's.	7. Prosperity to the Town.	The Deputy Mayor.
Rev. W. B. Hopkins.	8. The Chairman.	Master of Trinity College.
Dr. Leapingwell.	9. The Board of Directors.	Mr. Elliot Smith.
Mr. Town-Clerk.	10. The Shareholders.	Mr. C. Balls.
Mr. S. Harrell.	11. The Members of the House of Commons, especially those gentlemen who have honored this Meeting with their presence.	Mr. Adair, and
Dr. Paget.	12. The Engineers.	Mr. W.
Mr. C. F.		





ANNO DECIMO SEXTO

## VICTORIÆ REGINÆ.

Cap. xxiii.

An Act for supplying the Inhabitants of the University and Borough of Cambridge and other Places adjoining thereto with Water.

[14th June 1853.]

**W**HEREAS the University and Borough of Cambridge, and certain Parishes and Places adjoining thereto, are not at present well and sufficiently supplied with Water, and the Construction of Works for effectually supplying the same would be of local and public Benefit: And whereas the Parties herein-after named, and others, are willing to carry such Undertaking into execution; but the same cannot be effected without the Authority of Parliament; May it therefore please Your Majesty that it may be enacted; and be it enacted by the Queen's most Excellent Majesty, by and with the Advice and Consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the Authority of the same, as follows; (that is to say,)

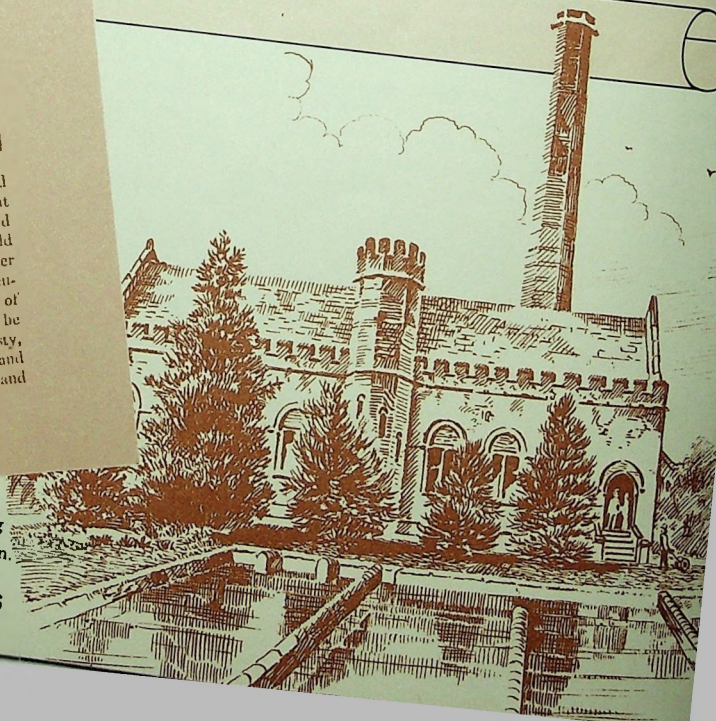
The original pumping station at Cherry Hinton.

by University and Town proved eminently satisfactory and continued until 1962.

The original works comprised the sinking of a well to a depth of 48 feet, the installation of pumping machinery (two 15 H.P. beam engines), the construction of a covered service reservoir on the top of Lime Kiln Hill, Cherry Hinton, having a capacity of one million gallons, and the laying of some 26 miles of 5 and 10 inch diameter cast iron mains. The opening took place on 23 October 1855.

### The First Board of Directors

The Rev William Whewell, DD, Master of Trinity  
The Rev Richard Okes, DD, Provost of Kings  
The Rev George Elwes Corrie, DD, Master of Jesus  
The Rev John Fenwick MA, Bursar of Corpus Christi  
The Rev William Bonner Hopkins, MA, Tutor of St Catherine's  
Ald. Elliot Smith JP, Estate Agent & Surveyor (Mayor)  
Ald. Joseph Wentworth JP, Auctioneer  
Ald. William Warren JP, Grocer  
Rowland Morris Fawcett, Surgeon  
Henry Hazard, Coal and Corn Merchant





The *Cambridge Chronicle* describing the opening states: 'We do not know that upon any former occasion we witnessed so satisfactory a union of the Town and University as in the celebration of the event we are about to record. The two bodies were engaged in a good work calculated to benefit the inhabitants of this place for ages to come.' The party, which included Dr Whewell, the Master of Trinity (Chairman), the Vice-Chancellor, the Deputy Mayor, the Professor of Geology (Adam Sedgwick) and Colonel Adair, M.P., first inspected the pumping station and the reservoir, where after witnessing the admission of the water, they filled their glasses with a stronger beverage to drink prosperity to the Company. On their return to Cambridge, jets of water discharged into the air from standpipes on Market Hill, King's Parade and in front of the Town Gaol, to the discomfort of some unwary spectators, inaugurated the arrival of the water in the Town. In the evening the proceedings were brought to a close by a dinner at the Lion Hotel, at which the toast list contained the names of no less than twenty-five speakers!

## The Fulbourn and Fleam Dyke works

To keep pace with growth, additional wells were sunk at Cherry Hinton in 1883 and were equipped with two 30 H.P. pumping engines each capable of pumping up to 0.75 million gallons a day. A few years later work began on a scheme to obtain further supplies from the village of Fulbourn, five miles east of Cambridge, where another large spring 'Poors Well' issues from the chalk. Water from this source first became available in 1891 and after the installation of larger pumps in 1897 the combined resources of this and the Cherry Hinton wells were 2.5 million gallons a day, sufficient to cope with demand until after the first world war.

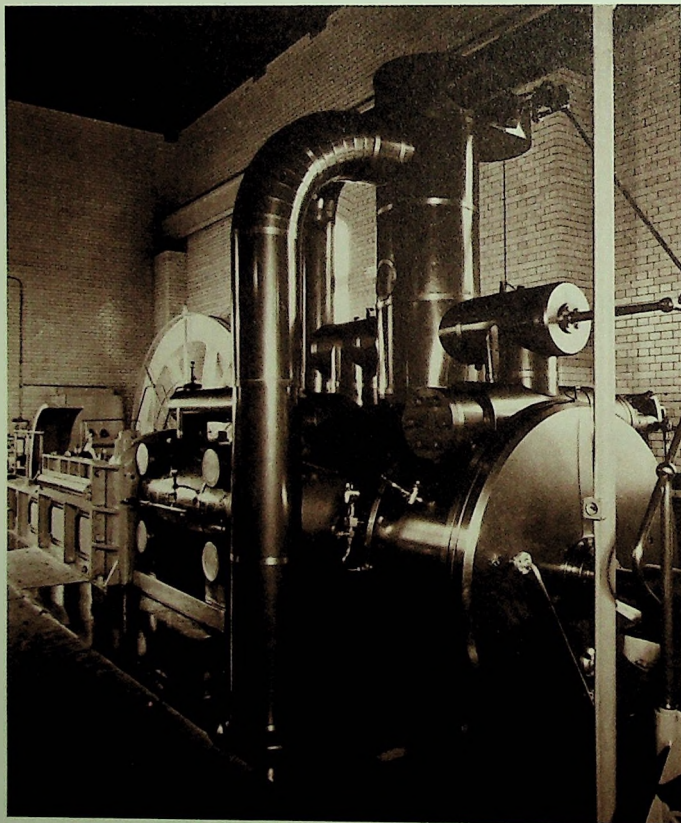
However, in 1903 cases of typhoid fever occurred at the Fulbourn Asylum and the risk of pollution of the Fulbourn well from the rather primitive sewage disposal works of the Asylum, although remote, could not be excluded. It was

Fulbourn pumping station.





decided, therefore, to seek statutory powers to sterilise the water by treatment with chlorine or ozone. This is believed to be the first such attempt by a water undertaking in this country and, despite much expert evidence in favour, consent was refused by the House of Lords Committee. Instead, approval was given to a new source, remote from habitation, some miles further east at the Fleam Dyke. The scheme comprised a well with two adits (tunnels driven out from the bottom of the well to collect more water), a pumping station with pumps driven by 180 H.P. compound horizontal steam engines and, at Lime Kiln Hill, an additional one million gallon reservoir. Work began in 1911 but, due to the 1914-18 war, was not completed until



Pumping engine at Fleam Dyke.

1921. Depending upon groundwater levels this source yields between 3.25 and 4 million gallons a day.

With the opening of the Fleam Dyke source both the Cherry Hinton station which was fast being engulfed in the outskirts of Cambridge and the Fulbourn works were closed. The Cherry Hinton well site was sold and the 'Spring-Head' land given to the City Council as a public amenity. The Fulbourn source was retained, however, and in 1941 it was reopened to provide badly needed extra supplies. Temporary electrical plant replaced the old steam plant and, of course, the water was chlorinated. After the war the station was completely renovated and reopened for permanent use in 1954 with an authorised maximum abstraction of 2 million gallons a day.

During the early 1970's the pumping engines at Fleam Dyke began to give trouble and maintenance costs climbed rapidly. This, together with soaring costs of coal and labour led to the electrification of the station. The steam engines finally stopped on 2 October 1976, having pumped 56,203 million gallons during their 56 year life.

## Cherry Hinton Softening Station

Although of the highest purity chalk water is hard and in 1935 the Company became the first undertaking in the country voluntarily to introduce water softening. The plant, installed in a new building at Cherry Hinton, employed the base exchange process to remove all the hardness from the water which was then mixed with an equal quantity of unsoftened water to produce a blended water of half the natural hardness.

Suggestions that soft water and cardiovascular disease were in some way related were first made in 1968 and, although the cause of the relationship remains unknown, since then it has been sensible not to extend artificial softening except to extremely hard waters. Cambridge water is not in this category and, consequently, when faced in 1975 with the need to renew and enlarge the plant at the softening station the Board decided that it would not be justified in doing so and closed the station after 40 years excellent service.

## Other major works up to 1961

A year before the start of the 1939-45 war a 2 million gallon reservoir was built at Lime Kiln Hill, as a civil defence measure, bringing the total storage capacity there to 4 million gallons. After the war consumption grew steadily by about 4% each year and by 1953 average daily consumption had reached 3.7 million gallons, uncomfortably close to the safe minimum yield of 4.3 million gallons of the combined Fleam Dyke and Fulbourn wells. To reinforce supplies the Company first built another reservoir at Lime Kiln Hill,



on this occasion of 5 million gallons capacity, which it completed in 1955 and followed it a year later with a new source of supply in the parish of Great Wilbraham authorised for an abstraction of 1.25 million gallons a day. At the same time a further new source was being sought resulting in the selection of a site in the parish of Babraham. An abstraction of 2 million gallons a day was authorised and the work of constructing the pumping station and main was completed in 1961. Like the Great Wilbraham station, this is a small simple building, unmanned, the pumps being operated by remote control and is a good example of the change in pumping station design made possible by the use of electricity instead of steam as the motive power.

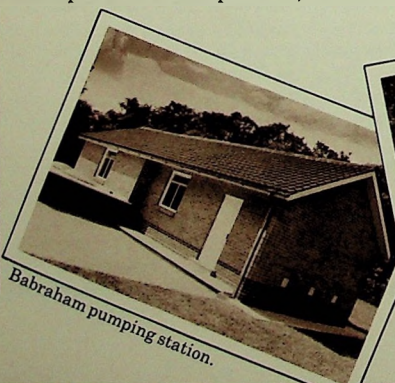
## The expansion of the Company

After the war, the Government adopted a policy, known as the 'regrouping' policy, aimed at reducing the number of water undertakings in England and Wales by encouraging amalgamations voluntarily wherever possible, but by compulsion if necessary. In the Cambridge area the Company was by far the strongest undertaking and between 1958 and 1961 the responsible Minister sought to persuade the local authorities that the best solution for the area was for the Company to take over their undertakings. Finding it impossible to obtain agreement on any one solution, the Minister finally imposed his view by making a Statutory Order under which the Company was required to take over on 1 April 1963 the water undertakings of five local authorities and two bulk supply joint water boards. This enlarged the area of supply from 60 to 453 square miles and the population supplied from 116,000 to 195,000.

Some of the undertakings acquired were badly run down and lacked adequate resources and the Company's most urgent task was to make good the deficiencies in these areas. Plans had been made and wherever possible work had been done before 1 April 1963 in anticipation of the expansion, but much remained to be done to bring

the added areas up to the standards maintained in the Company's original area. Of the works acquired on 1 April 1963, several were in course of construction and were completed by the Company. It will be noted that most of the sources were very tiny ones, only Fowlmere producing in excess of half-a-million gallons a day. Two, Willingham and Over, were shut down immediately on takeover because of doubtful water quality and at a later date the Willingham site was sold. Between 1961 and 1965 the Company constructed the following works for the particular benefit of the transferred areas:

A 1 million gallon reservoir and booster station at Coton; a 500,000 gallon reservoir at Bourn and a 250,000 gallon reservoir at Great Eversden; a new source at St Ives; new depots, offices and houses for staff at St Ives and Melbourn. In addition, many miles of new main were laid to provide badly needed reinforcements to supplies.



Babraham pumping station.



St Ives Depot.

CAMBRIDGE Water Company		
WORKS ACQUIRED ON 1 APRIL 1963		
SOURCES OF SUPPLY		YIELD (Million Gallons per day)
Earith		0.28
Fenstanton		0.09
Over		0.09
Willingham		0.06
Bourn		0.03
Kingston		0.17
Lord's Bridge		0.21
Harston		0.11
Croydon		0.06
Fowlmere		0.37
Linton		0.91
Sawston		0.43
		0.28
RESERVOIRS		
Wistow		
St Ives		
Bourn		
Abington		
Croydon		
Heydon Hill		
Linton		
WATER TOWERS		
Ramsey		
Warboys		
Bluntisham		
Over		
Willingham		
Cottenham		
Linton		
Longstowe		
Sawston		
Shudy Camps		
MAINS		435 MILES



The amalgamation cost the Company well in excess of £1,000,000 while at the same time it had an obligation to equalise charges throughout the area of supply. In general charges in the transferred areas were about 50% higher and the equalisation was effected in two stages over a period of six years. Rural consumers thus gained the double benefit of improved supplies at lower charges.

Other changes consequent upon the expansion were the setting up of arrangements for consultation with the local authorities within the area of supply by the appointment of a Joint Consultative Committee, the election to the board of two directors representative of the rural areas and a change in the Company's name. It was recognised that the old name was no longer appropriate now that the supply area included most of Cambridgeshire and part of Huntingdonshire and, accordingly, the name was changed to 'The Cambridge Water Company'.

## **The reorganisation of the water industry The Water Resources Act, 1963**

The rapid growth of water consumption after the war gave rise to fears that, before very long, demand would overtake supply in some parts of the country and this led, in 1963, to the passing of a Water Resources Act setting up new machinery to deal with the problem. It created twenty-seven River Authorities in England and Wales with areas related to the basins of main rivers and charged them with the duty of conserving, redistributing or otherwise augmenting water resources in their areas. They were given wide powers including the power to construct new source works. A Water Resources Board was also set up to investigate and plan on a national scale and to advise the Authorities and the Minister. To enable the Authorities to carry out their conservation functions the Act created a licensing system to control the abstraction of water. Thereafter, no new abstraction could take place without a licence from the River Authority (existing ones were given licences of right). Charges, based primarily upon the quantity authorised to be abstracted, are made for these licences and have grown to become a significant burden upon abstractors, e.g. the annual amount paid by the Company now amounts to about 10% of its operating costs.

## **The Water Act, 1973**

This Act completely reorganised the water industry in England and Wales. It created 10 Regional Water Authorities to cover the whole country and made them responsible for all water services within their areas. In addition to water supply these include sewerage and sewage disposal and all the functions performed by River Authorities. These were abolished, as were Water Boards, while

Local Authorities lost their sewerage and water supply functions but the 28 Water Companies were retained. This was achieved by requiring the Water Authorities to carry out their water supply functions in the Water Company areas through the Companies. The Water Companies thus became agents of the Water Authorities but of a rather special kind. They supply water on behalf of the Authorities but remain independent in all essential matters such as the raising and spending of capital, the fixing of charges and the appointment of Directors and staff. The Authorities control the abstraction of water by means of the licensing system but they have a duty to make available to Companies sufficient quantities to meet future needs. The formal relations between an Authority and a Company are governed by an agreement but there is ample provision for consultation both nationally and locally on matters of mutual interest and such consultation takes place at all levels as part of the day-to-day routine.

It might reasonably have been expected that the 1973 Act would have ended what had been a long period of uncertainty for Water Companies but this was not to be. The Labour government, elected in 1973, announced its intention to bring them into public ownership. A local campaign showed a substantial majority of the Company's consumers to be against this proposal. In the event nothing happened because of lack of support in Parliament and with the return of a Conservative Government, in 1979, the threat was removed.

## **The search for new sources of supply**

In the first full year of the expanded undertaking, 1964, consumption averaged 7.9 million gallons a day. By 1981 it had grown to 14.3 million gallons a day due in part to a population increase of 51,500 (26%) and in part to increased use – consumption per head having risen from 39.4 to 57.2 gallons per day (45%). Finding new sources of supply to meet this increased demand has become more and more difficult and has been the constant pre-occupation of the Board since the late 1960s.

During the 1960s two substantial new sources were found, one, near the village of Melbourn, licensed originally for 3 million gallons a day and a second in the parish of Westley Waterless (apparently a corruption of Water Leas) licensed for 2½ million gallons a day. Brought into use in 1967 and 1972 respectively these were expected to be adequate until 1977. By 1970 it was urgent to decide upon the source of further supplies but this was now a matter for the Great Ouse River Authority and, after 1973, its successor the Anglian Water Authority.

A report by consulting engineers in 1964 had advocated 'groundwater low level storage' schemes in the Great Ouse basin. Such a scheme involves peppering an area with boreholes from which



water is pumped to lower the underground level. This makes room for additional storage of water which otherwise would run to waste. The water pumped out is used partly for public supply purposes and partly to maintain stream flows at controlled levels. In 1966 the Water Resources Board supported this proposal and recommended schemes in the Ely-Ouse catchment as the source of future supplies for the Company. Following a pilot scheme in the Thetford area the River Authority prepared a scheme for the river Rhee (a tributary of the Cam to the south west of Cambridge) involving 18 boreholes of which 7 were to be for public supply purposes with an estimated yield of 3.3 million gallons a day. Unfortunately progress was not fast enough for the Company's needs and as an interim measure the River Authority agreed, in 1971, that the Company should itself develop four sites which would fit into the eventual scheme. These were to yield 1.4 million gallons a day but in one case a problem arose which was not resolved until 1979 leaving only 3 sites, expected to yield 0.75 million gallons a day, barely enough to meet two years increase.

Ways of increasing resources were now under continuous investigation by the Company and one way found was to pump greater quantities from existing sources during periods of peak demand without exceeding the authorised annual abstractions. Where necessary variations to licences to permit this were obtained. Two private sources were also acquired, the first, a small source at Duxford Airfield which originally supplied the airfield and servicemen's houses, was purchased from the Ministry of Defence in 1971. The second, at Sawston, originally supplied Towgoods paper mill and was acquired in 1977. Licensed for 1.27 million gallons a day, this source has been of great value in filling the gap until supplies are available from the Rhee groundwater scheme.

The sites from which these supplies are to be obtained were not finally determined by the Water Authority until June 1980, when it allocated three of the new borehole sites from the Rhee scheme and agreed to increased abstraction from two of the Company's existing sources. Together, after allowing for a reduction in the yield of the Melbourn source, these are expected to produce an additional 2.5 million gallons a day. At the present time, the early 1980's, growth in demand is slower because of economic recession. If, after the recession ends, the rate returns to that prevailing during the 1970's this is sufficient for about five years increase only – and five years is a very short time in which to find and develop further new sources. Both the Authority and the Company are urgently investigating possible sites for the next addition to supplies in the catchments of other streams in or adjacent to the Company's area and the possibilities for the longer term have been under investigation for some time.

## Controlling the system

Keeping pace with growing demand requires not only regular additions to sources of supply but also more storage capacity, booster stations and additional mains. During the period from 1964 to 1981, in addition to the works attributable to the expansion of the Company there were constructed seven service reservoirs, four water towers, three booster stations and 358 miles of main. By the end of 1981 the Company's works included 20 sources of supply with another 4 due for early development, 20 service reservoirs, 12 water towers, 9 booster stations and 1134 miles of main.

Controlling this complex network by the old methods was becoming increasingly difficult and to solve this problem a computerised telemetry control system has been installed. Completed in 1980 the system uses radio links, underground cables and telephone lines to feed information from the works, e.g. pumping rates, water levels, chlorination states etc. back to a central control room at the Cambridge headquarters. By this means one operator is able to monitor continuously the operation of the whole network, control the operation of the pumps and take appropriate action to deal with any fault. Alarms are initiated if any of the readings fall outside pre-set limits.



Telemetry Control Room.



## Administration

To administer more effectively the enlarged area created by the 1963 expansion it was divided into three divisions; a northern division with an office and depot at St Ives, a southern division with an office and depot at Melbourn and an eastern division operating from the headquarters in Rustat Road, Cambridge. The divisions are mainly concerned with day to day distribution functions such as the arranging of new supplies, the extension of distribution mains and work on consumers' premises. Other operations are controlled from the Cambridge headquarters. The site of these headquarters was originally acquired for a depot with workshops and stores which were built in 1937. At that time the offices were in Bene't Street, Cambridge but these had been outgrown by 1956 and new offices were built on the Rustat Road site. This was extended in 1981 when a piece of adjoining land was acquired and a new wing to the offices built.

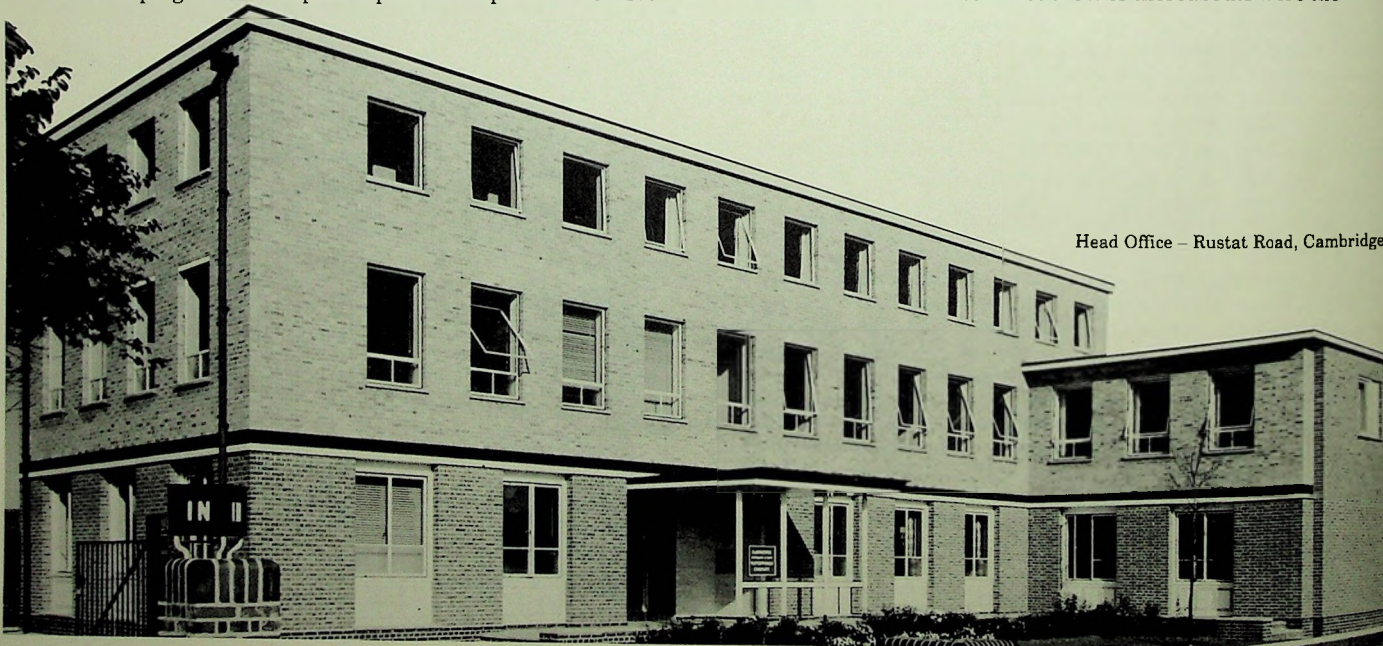
## Capital expenditure

A continuous programme of capital expenditure upon new works is

necessary to keep pace with the steadily growing demand for water. This has been so since the Company was formed but over the years there has been a striking change in the amounts involved. In the early days when growth was slow and costs low the amounts involved were relatively small and at the time of its centenary in 1953 total capital spending amounted to only £404,000. By 1965 this had increased to £2,129,000 mainly due to the addition of the amounts paid for the undertakings acquired in 1963 plus the cost of new works constructed for the benefit of the added areas. Thereafter and for the next ten years spending averaged around £300,000 a year – much higher than prior to the expansion but still a relatively modest figure. It was from 1974 that a steep climb began, propelled by accelerating inflation, until by 1979 it had reached £1,000,000 a year with further increases forecast for future years.

Water Companies obtain most of their capital through the Stock Market by issues of ordinary, preference or debenture stocks. The maximum dividend or interest payable is controlled by law and the rate for each stock is fixed at the time of issue in line with ruling market rates. When interest rates of 5% or thereabouts were the

Head Office – Rustat Road, Cambridge.



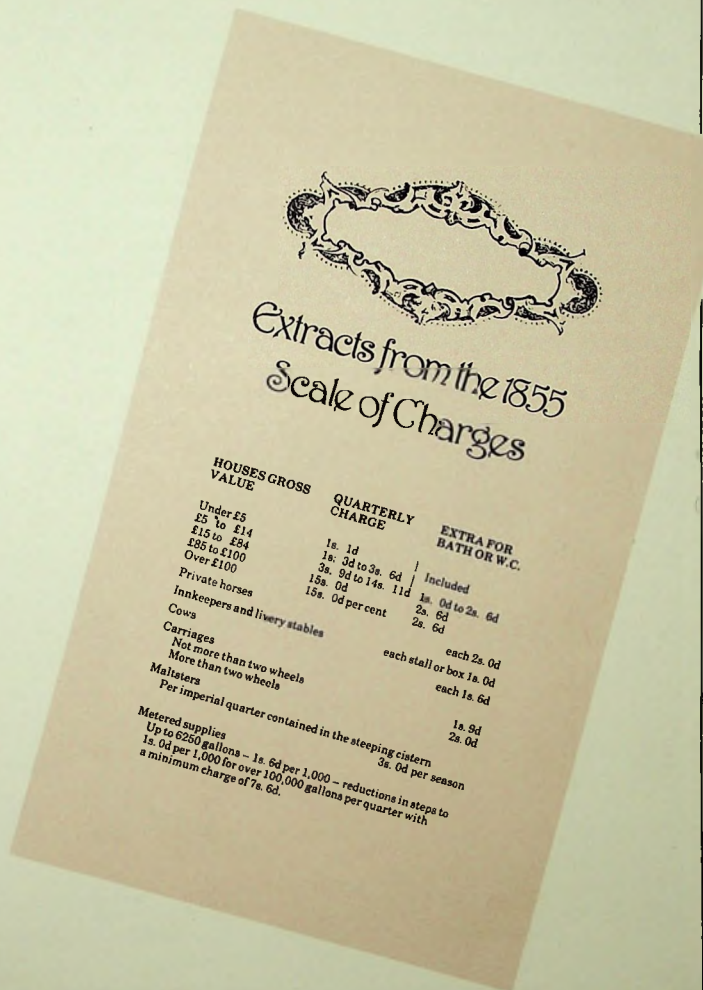


norm, stocks with long lives – 20 years or more – were customary, but the very high rates of recent years have led to the issue of stocks with lives of not more than five to seven years usually in the form of redeemable preference stocks. By the careful timing of such issues the Company has been successful in financing its capital requirements at very favourable rates.

CAPITAL AND BORROWINGS OUTSTANDING AT 31 DECEMBER 1981		
Issued	Capital Stocks	Amount £
Up to 1952	10% Ordinary	82,500
	7% Ordinary	139,723
1953	Conversion of above to 5% (Now 3.5%)	360,612
1962	6½% (Now 4.55%) Redeemable Preference 1982–84	405,339
1963	6% (Now 4.2%) Redeemable Preference 1984–86	600,648
1977	8¼% Redeemable Preference 1982	1,302,672
1979	8% Redeemable Preference 1984	2,500,000
1981	8% Redeemable Preference 1986	2,500,000
Debenture Stocks & Mortgages		
Up to 1954	4% Consolidated Perpetual	191,918
1960	5½% Redeemable 1983–85	78,850
1965	7% Redeemable 1983–85	500,000
1968	7¾% Redeemable 1988–90	500,000
1971	9¼% Redeemable 1992–97	740,000
1976	13¼% Mortgage repayable 31 Dec 1982	500,000

## Charges

Public water supply undertakings came into being to supply water for domestic purposes as a disease prevention measure. To encourage use charges were based upon the annual value of the user's property – in those days a reasonable measure of ability to pay. Limits were imposed by law, e.g. the Company's 1853 Act prescribes the following maxima: for a house with an annual value under £4 – 4/4d per annum, for annual values between £5 and £100 at the rate of £5 per cent per annum and over £100 – £4 10s per cent per annum. It was not until 1910 when, faced with the cost of constructing the works at Fleam Dyke, that the Company had to seek an increase in these maxima. There was no legal obligation to supply water for non-domestic purposes but, if given, charges were by agreement.





The Company continued to levy charges under its Private Act powers until 1959 when it became expedient because of pending 'regrouping' to adopt the charging code contained in the Water Act 1945, a code which was rapidly becoming standard in England and Wales. This caused a number of detailed changes but the basic principle, of charges based upon rateable value, remained unaltered. Charging on a quantity basis was confined to water used for industrial and trade (non-domestic) purposes and for domestic purposes to premises using substantial quantities, e.g. schools, hospitals and some commercial premises. Metered domestic supplies were subject to a minimum charge equal to the water rate and in time this was adopted as the basis for all metered supplies.

While water charges were very low these methods of charging were accepted but with charges rising rapidly mainly because of inflation there came an increasing number of complaints against the unfairness of rateable value as a basis of charge. In particular, minimum charges for metered supplies were heavily criticised following the 1976 drought because they operated to the detriment of

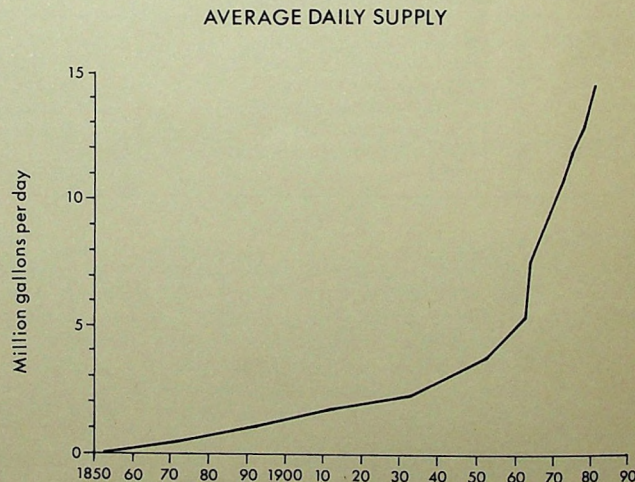
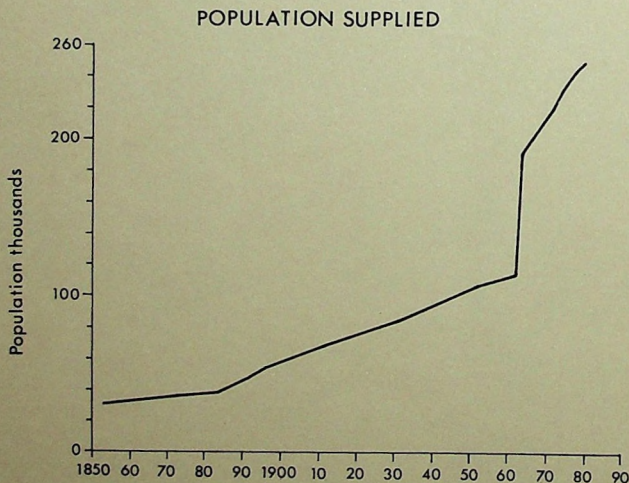
public spirited users who had tried to economise.

The Company responded by becoming one of the first undertakings to change its methods of charging, when, in 1977, it introduced a system of two-part tariffs which dispensed with minimum charges. The two parts consist of a fixed charge to cover the costs of making the supply available and of metering (if applicable) and a charge per 1,000 gallons (or per cubic metre) for the quantity used. If the supply is not metered the quantity element of the charge is a rate levied on rateable value but any user is free to transfer to the metered supply tariff provided he pays the cost of installing a meter. Thus no user need pay more than the cost of the water he uses plus the cost of measuring the quantity.

## Conclusion

Life for the Company has changed more in the last twenty years than during the whole of the previous century. Until 1962 it was its own master free to carry out its task in the way it thought best subject

## THE GROWTH OF THE COMPANY



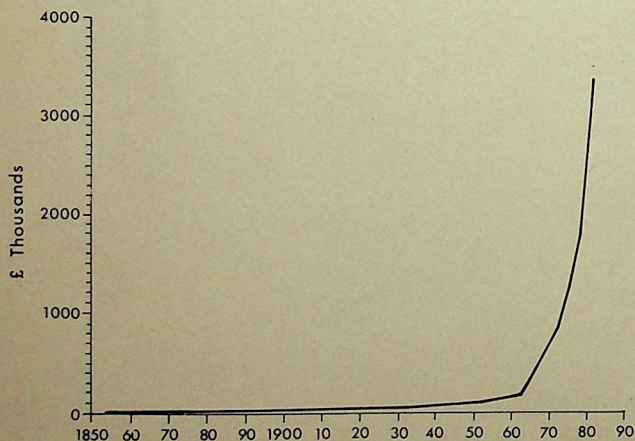


only to legal requirements designed to prevent the abuse of monopoly powers. New resources were required at infrequent intervals and were not too difficult to find, inflation was no problem and charges were so small a burden as to bring little comment from customers. Today the picture is very different. The 1963 Water Resources Act and the 1973 reorganisation together have imposed many new constraints and other changes have brought their own problems. The difficulties of obtaining new sources of supply have already been described. In the matter of water quality, it is no longer enough to ensure freedom from bacteriological pollution. There is a potential risk from heavy dressings of nitrogenous fertilizers used during the last war to increase crop yields, requiring careful monitoring of nitrate levels. Limits are also now set for other substances, e.g. lead content. Although lead is not a problem in the Company's area, this fact has to be demonstrated by the analysis of samples. Personnel matters are no longer solely a Company responsibility – pay and conditions of service are negotiated nationally and regional committees and tribunals deal with local issues. Charges have been

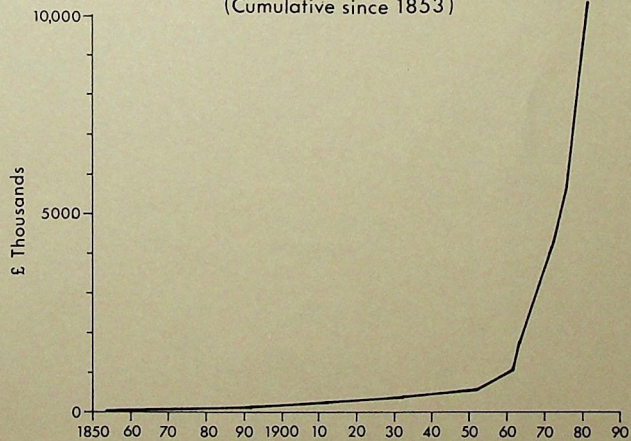
in the melting pot and the substantial increases resulting from inflation have evoked criticism further compounded by the addition to bills of Water Authority charges for sewerage etc. which are now collected by the Company on behalf of the Authority. These and other changes have created demands for more and more information thus adding to administrative requirements and costs. There is hardly any area of operation which is not more complex than it was twenty years ago.

Despite all the changes the Company's primary task remains the same – that of providing its consumers with an abundant supply of pure and wholesome water as economically as possible. Its hope is that it will be able, in co-operation with the Anglian Water Authority, to continue to do so as successfully as in the past, preserving unbroken its proud record that, notwithstanding Cambridge's low average rainfall and liability to serious droughts, it has never once, in nearly 130 years, been necessary to deprive consumers of an unrestricted supply.

TOTAL ANNUAL REVENUE



CAPITAL EXPENDITURE  
(Cumulative since 1853)



# Area of supply



## Reference

■ Office & Depot

▲ Booster Stn

○ Tower

□ Reservoir

▲ Source Pumping Stn

A Head Office & Eastern Division Depot.  
Rustat Road, Cambridge.

B Northern Division Office and Depot.  
Broad Leas, St. Ives.

C Southern Division Office and Depot.  
Orchard Road, Melbourn.

- |                 |                  |
|-----------------|------------------|
| 1 Fleam Dyke    | 21 Cherry Hinton |
| 2 Fulbourn      | 22 Coton         |
| 3 Gt. Wilbraham | 23 Rivey Hill    |
| 4 Babraham      | 24 Abington      |
| 5 Linton        | 25 Croydon       |
| 6 Sawston       | 26 Eversden      |
| 7 Fowlmere      | 27 Bourn         |
| 8 Croydon       | 28 St. Ives      |
| 9 Bourn         | 29 Wistow        |
| 10 Kingston     | 30 Shudy Camps   |
| 11 Lords Bridge | 31 Balsham       |
| 12 Harston      | 32 Madingley     |
| 13 Fenstanton   | 33 Longstowe     |
| 14 Earith       | 34 Over          |
| 15 St. Ives     | 35 Bluntisham    |
| 16 Melbourn     | 36 Warboys       |
| 17 Westley      | 37 Ramsey        |
| 18 Duxford      | 38 Castle Hill   |
| 19 Heydon       | 39 Wandlebury    |
| 20 Sawston Mill |                  |



